The Role of Digital Story in Promoting Preventive Health Concepts among Primary Stage Students

https://doi.org/10.3991/ijim.v17i13.39469

Reem AbdElkareem AlOmoush
Middle East University, Amman, Jordan
ralomoush@meu.edu.jo

Abstract—The study aims to examine the role of the digital story in promoting the concepts of preventive health among primary-stage students from the viewpoint of primary-stage teachers, using the descriptive approach. To this end, a questionnaire was designed to serve as the study tool, and it consisted of two parts. The first part asked about personal information related to the study sample, and the second part included thirty items within six main concepts of preventive health, namely healthy food, risk management, personal health, environmental health, first aid, and physical health. The questionnaire was distributed among the study sample amounting to 218 male and female teachers for the primary stage. The findings of the study revealed that the digital story has a key role in promoting preventive health concepts among primary-stage students in general. However, the role has a medium degree, due to its positive impact on primary stage teachers by reducing the time and effort used to communicate preventive health concepts to the students. The study recommended the importance of using the digital story in education, especially in the primary stages, in addition to refining the skills of primary stage teachers in how to benefit from the digital story in presenting the concepts of preventive health and in achieving the educational objectives. The study also highlights the need to find a balance in including preventive health concepts in the various curricula.

Keywords—digital story, preventive health concepts, class teachers, primary stage

1 Introduction

Education is responsible for building humans and developing their mental, physical, social, and psychological aspects. This building cannot be erected without one of the most important requirements, which is health. Therefore, health education has received explicit attention from educators, specifically in the primary stage for students since this stage is characterized by its sensitivity and vulnerability to the surrounding environmental factors, nutrition, and the spread of infectious diseases, as witnessed by the world, such as Coronavirus and many other infectious diseases. Hence, there is a pressing need to follow a new approach to preserve the health of students and protect them from infectious diseases to ensure the continuity of the educational process. So, the

educational systems focused on preventive health concepts in the school curricula and presented them to students using the appropriate means. It has become crucial to use different educational means with digital scientific development, including the digital story, to promote these concepts among students at that stage. Here, class teachers are a key factor in promoting students' preventive health concepts, so their work is not limited to presenting general health concepts, but they raise awareness of students' preventive concepts and provide them with information and expertise.

Nowadays, Learning Objects (LOs) are one of the building blocks of Information and Communication Technology (ICT) supported learning [1]. So digitization in education is a must, especially after the Corona pandemic, so the effective integration of technology into the educational process by teachers is one of the main factors in developing education policy worldwide [2, 3]. Students in the primary stage have become accustomed to technology, and education with technology is considered more effective [4]. Therefore, the digital story is considered one of the important applications and new models of digital education, which leads to achieving active interaction by learners with the educational material [5]. It also makes learners more active in an authentic context close to their sensory perceptions and helps them to think in a sound scientific manner. Additionally, it involves cognitive, emotional, psychosocial, and motor skills [6].

The digital story is an effective technological tool in teaching in the 21st century, as it provides a framework for how the teacher and the learner share learning experiences with each other [7]. It is defined by Thang et, al [8] as a method that combines the art of narration with a collection of multimedia. Shelton et, al [9] define it as a harmony between storytelling with visual communication and the accompanying images and sounds it includes. The digital system consists of various components such as texts, images, animations, and sounds [10].

Creative computing has been successfully employed in the humanities, such as storytelling, the digital story and storytelling first emerged in the 1980s, when a Center of Digital Storytelling CDS was established by Jo Lambert and Dana Atchley in California, USA. Back then, the digital story was referring to a personal story told by its creator for a period of two to three minutes [11, 12]. The art of digital storytelling and its accompanying activities are a source of providing students with appropriate opportunities to practice organizing and applying ideas as the story represents a sequential series of events that is easy to simulate. The story includes a suspense element that contributes to following the sequence of events to the end, helps to know the realities of the world, and employs them in everyday life, so the student feels the importance of what he learns in his life [13].

Digital storytelling emerges from the integration of storytelling and digitization to fulfill learning needs such as communication and self-expression and to facilitate teaching different skills [14]. It advances understanding by presenting new vocabulary and easily arranging it within the context of the story [15]. Therefore, it is one of the most important tools and current needs for shaping classrooms in the 21st century [16]. Norman believes that digital storytelling is a combination of verbal narration of the story, some visual aids and soundtracks, and modern techniques for editing and sharing the story [17]. It also facilitates visual and auditory learning, helps connect the school with the community, and generates an atmosphere of fun and excitement [18]. The use of

digital storytelling allows the digital story to enhance students' thinking, analysis, and synthesis skills [19].

The elements of the digital story are represented first by the narrator's viewpoint, the dramatic question that attracts the attention of the recipients and is answered at the end of the story, and the emotional content in which the feelings of the recipients are shared through love and humor, among other feelings. The narrator's voice element is intended to help recipients understand the events of the story, as sounds and music are employed to increase the degree of recipients' interaction. The brevity enables the inclusion of information necessary for the content of the story, and the element of speed aims to display the sequence of story events [20]. Therefore, the digital story is used to strongly attract students' attention to the education process because they feel that it is a new method that they are not used to it before and that it works to provide an atmosphere of fun and enjoyment and reduce the level of anxiety in class, in addition to the development of multiple skills among students [21].

On the one hand, it is argued by Al-Harbi that educational research agreed that the digital story offers many advantages to the educational process, as it helps in understanding difficult materials and retaining new concepts so that learners retrieve what they learn through the context of the story more than others because the scientific material is presented in an enjoyable, interesting, and exciting way to develop critical and analytical skills by eliciting meanings from the story [22]. Marciom and Sarbia also emphasized the effective role of the digital story in education, through which knowledge, values, and attitudes can be transferred, and where it is possible to employ it in all grades and with different subjects [23]. They also highlighted its positive role on students in terms of its ability to improve motivation for learning. This is also indicated by the study conducted by Preradovic et, al which aimed to integrate technology through the digital story in education [24].

Besides, preventive health and its concepts play a major role in the educational system. [25] Believe that preventive health refers to anticipating and preventing diseases before they occur and aims to raise the health level of groups and individuals by employing certain ways and principles. [26] states that preventive health concepts include all health information, knowledge, attitudes, and behaviors that students receive in relation to personal hygiene, health nutrition, accident prevention, first aid, and environmental health, in addition to diseases and how to prevent them. Concepts of preventive health are among the fundamental concepts that must be introduced to students at the primary stage, as they help them protect themselves from diseases and dangers they may face in the future and prepare them for life by providing them with the knowledge and necessary health skills [27].

Preventive health has two concepts: one is at the individual level, and the other is at the group level. The first refers to a set of precautionary measures taken by the individual to preserve his health and protect it from diseases and epidemics. The second concept is considered societal as it refers to all measures taken by countries to anticipate epidemic diseases before they occur, prevent or limit their spread, and mitigate their damage if occurred [28].

One of the most important concepts of preventive health that the current study can address is food health. In this regard, two basic issues will be focused on, namely the

quality and quantity of food and food hygiene and being far from pollutants. Sports will also be addressed as how practicing healthy physical and motor skills while adhering to simple rules achieve security and safety. In addition, health education will be tackled in relation to providing information, spreading awareness, conducting regular check-ups, identifying dangerous causes of disease, and discussing tips on following a healthy and balanced lifestyle [29, 30, 31].

The study also examines the concepts of risk management because risks nowadays, as well as the resulting disability, distortion, or death, have become more serious for students than all other diseases. Many students are exposed to accidents and injuries that are often serious to the extent that some pose a threat to their lives. Such accidents that threaten their lives are not germs or microbes but can be found in everything surrounding them [32]. Moreover, personal health is an important component of a healthy and sound life through protection from disease and infection, as personal health raises students' morale and gives them self-confidence, so maintaining personal health is an important pillar of maintaining students' health and natural growth [33].

From all the above, it can be concluded that the digital story can be relied upon to present the concepts of preventive health, simplify them, and bring them closer to students' minds at the primary stage through steps taken by class teachers, as the digital story has many elements and characteristics that depend on the creative narration that enables the educational process to achieve its goals in the 21st century. This is what [34] state in their study that implementing digital storytelling in teaching and learning activities helps learners develop critical thinking and problem-solving skills. In light of this, the researcher of the present study proposed in the following figure eight steps for the digital story to promote preventive health concepts for primary-stage students, through problem-solving. "See Figure 1".

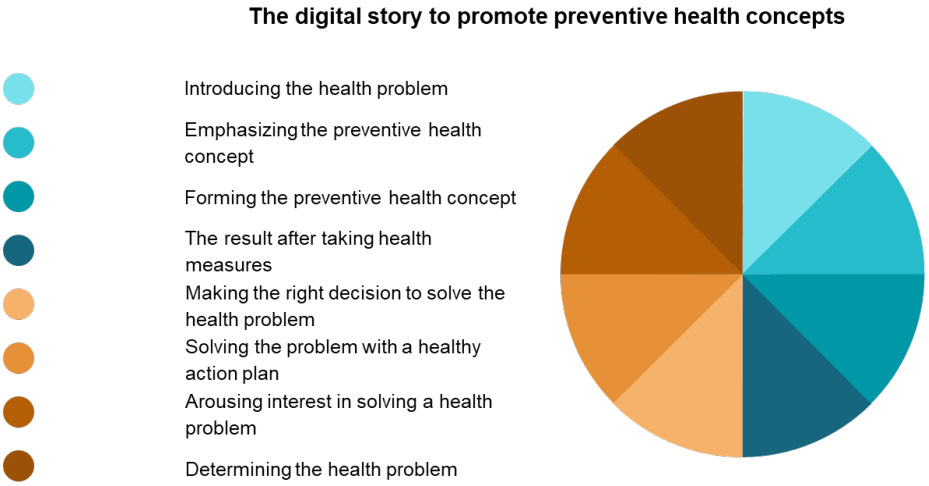

Fig. 1. The proposed eight steps to promote preventive health concepts through the digital story

Education policies seek to develop strategies to improve the quality of education and the outputs, specifically after the Corona pandemic and its variants that still threaten humanity. Most educational institutions in the world now tend to focus more on the concept of health protection for students, so it was necessary to study how teachers of the primary stage employ the digital story to enhance preventive health concepts. This is in response to modern digital trends by activating digitalization in student education and the fact that the world is suffering from a critical health condition after the Corona pandemic, in addition to the emergence of many diseases that affect students' general health, and the importance of having a list of preventive health concepts to be included in the primary school curricula and teacher training on how they were presented to students, all of which were a motive for conducting this study.

2 Literature review

The trend toward digital education has made the digital story a reliable learning method for the learner, and in light of this, many researchers have conducted studies on the digital story and digital storytelling in the educational process. One example of the studies conducted in this field is the study of Demirbaş and Şahin [35] in which they studied the impact of the digital story on creative writing skills among fourth-grade students. The study found that the digital story increased creative writing skills and grades among the students in the experimental group. In addition, the effect of the digital story presented to students in the experimental group on creative writing skills was greater than that of students in the control group who were taught using the traditional paper method.

Munajah, Sumantri, and Yufiarti [36] conducted a study to examine the use of digital storytelling to improve students' writing skills. They aimed to know the needs of teachers and students in using digital storytelling. The results of the study indicate that offline and online learning requires the teacher to be creative enough to maintain an active and enjoyable learning process for primary school students in which learning goals are achieved.

Sawalmeh [37] conducted a study in which he aimed to identify the attitudes of Jordanian primary school teachers toward employing storytelling in mathematics. The results indicated that the primary school teachers' attitudes are positive, and it was found that storytelling improves students' academic performance in mathematics, motivates them, and makes them enjoy learning.

Al-Ardan [38] conducted a study to explore the effectiveness of interactive educational stories in improving some oral skills among sixth-grade students. The results showed that there were statistically significant differences in the post-application of oral expression skills, in favor of the experimental sample in post-application, due to the interactive educational stories. The researcher recommended the need to take advantage of the interactive educational stories and use them with students of all grades of the primary stage.

Yocom, Bashaw, Price, and Cook [39] conducted a study on the perceptions of digital storytelling in the classroom, in which an innovative activity using digital storytelling in the classroom was developed, followed by group care planning activities with some objectives based on the QSEN's patient-centered care efficiency initiative. The results indicated that digital storytelling generates positive feedback toward participatory learning, and the study recommended the use of digital storytelling to design integrated curricula, which support effective learning.

Wu and Chen [40] also conducted a study entitled 'A systematic review of educational digital storytelling,' where a systematic review of 57 studies on educational DS (EDS) is presented. They found that participants in EDS enrolled in primary, secondary, and higher education mostly study scientific, humanities, and social science majors. Regarding the research methodology, most of the studies adopted the qualitative approach and mixed methods, and the study recommends conducting more research on the design and use of digital stories in education.

Al-Barri [41] conducted a study to identify the impact of digital storytelling on developing listening comprehension skills among third-grade female students in the Mafraq Governorate. The results of the study indicated that there is a statistically significant effect on listening comprehension skills due to the teaching strategy in favor of the experimental group that was taught using the digital story. It was recommended that there is a pressing need to pay more attention to implementing the digital story in teaching students at the primary stage.

Furthermore, Hafez [42] conducted a study to identify the effectiveness of using the environmental digital story in teaching social studies to develop environmental awareness and behavior among fourth-grade students. The results of the study showed a positive and high correlation between the environmental awareness of fourth-grade students and their environmental behavior due to employing the digital story in their learning. This indicates the effectiveness of the environmental digital story and that they must be used and activated.

Abdel-Moamen [43] conducted a study aimed at identifying the effect of using digital story on developing some health concepts among kindergarten children. The results of this study showed that there is a high and positive impact of using the digital story to develop health concepts, and it was recommended that attention shall be paid to designing activities that help early children acquire health concepts.

Al-Zuhd [44] also conducted a study to investigate the impact of digital storytelling on conversation skills and motivation among learners of English as a foreign language at the undergraduate level. The findings showed that all students who learned using digital storytelling improved their conversation skills, and their motivation was enhanced. In general, the study showed that using digital storytelling in teaching English has positive effects on students' conversational skills and motivation.

Fletcher and Mullett [45] conducted a study that aimed to provide opportunities for intergenerational knowledge sharing of healthy lifestyles in order to facilitate guiding young people and the elderly and increase the self-esteem of young people through cultural practices and community outreach by creating and sharing digital stories. Participants in the workshop were gathered to create digital stories that focus on community ties, family history, and healthy lifestyles. The results of the study showed that

digital stories are active among generations and involve community members in creating digital representations of healthy lifestyles. They also pave the way for critical reflection on historical, cultural, and spiritual ideas of health and are a tool for health promotion in developing societies.

Based on the previous studies reviewed above, it can be noted that the studies showed the role, impact, and effectiveness of the digital story and digital storytelling in different variables, such as the studies of Demirbaş and Şahin [35], Munajah, Sumantri, and Yufiarti [36], Sawalmeh [37], Al-Ardan [38], Yocom et, al [39], Wu and Chen [40], Al-Barri [41], Furthermore [42], Abdel-Moamen [43] and Al-Zuhd [44].

The researcher has benefited from several things that previous studies did, such as theoretical literature, procedures, and some study tools. What distinguishes this study from other previous studies is its investigation of the role of the digital story in promoting health concepts, specifically at the primary stage of education, and therefore its purpose, sample, and tool are unique and original. To the best of the researcher's knowledge, there are no studies that investigate the role of the digital story in promoting the concepts of preventive health, so this study aims to examine this role and enrich the educational literature with more information on the subject of health preventive education. It also aims to shed light on the interest in including the digital story in the curricula and teaching it on modern educational scientific bases.

3 The study's problem

This study was motivated by a closer look at what the world is nowadays witnessing of the unprecedented spread of various epidemics, and the role of society in controlling their spread and reducing their risks to students' health through adherence to preventive health instructions. Therefore, preventive precautions are currently among the first issues that the various systems have addressed, notably the educational system, in which interest has extended to its various elements, including the student, curriculum, and teaching methods in the digital era. The way digital teaching methods can be used to promote preventive health concepts among students at the primary stage was also focused on ensuring their existence in the educational process. This is indicated by the study done by Tzavara et al. [46] on promoting educational technology for its many benefits. So, it is necessary to understand the relationship between the digital story and preventive health concepts at a time when many complaints are made that students in the primary education stage are exposed to the risks of newly emerging epidemics such as the coronavirus, monkeypox, and respiratory syncytial virus, among other epidemics.

It is evident that the trends on which this study was based are consistent with the educational development trends adopted by educational systems in various countries of the world and with modern educational studies that call for the use of technology in basic education, as it is considered a new experience in teaching school subjects to students at this stage. As Raja and Lakshmi Priya [47] pointed out in their study, technology has contributed to improving the quality of educational activities that meet today's needs. Therefore, we need to study the role of the digital story in promoting the

concepts of preventive health from the viewpoint of the primary-stage teachers themselves, who are considered the main pillar of digital education and the main engine of the educational process. The study attempts to answer the following questions:

3.1 The study's questions

- What is the role of the digital story in promoting the concepts of preventive health among primary-stage students?
- Are there statistically significant differences between the responses of the study sample about the role of the digital story in promoting preventive health concepts due to gender, academic qualification, and years of experience?

3.2 The study's objectives

The study aims to enhance the concepts of preventive health among primary-stage students, by the following:

- Determining the preventive health concepts that should be promoted among students in the primary stage.
- Revealing the role of the digital story in promoting the concepts of preventive health at the primary stage.
- Investigating whether there are any statistically significant differences between the study sample responses about the role of the digital story in promoting preventive health concepts due to the variables of gender, academic qualification, and years of experience.

4 Methodology of the study

The study adopted the descriptive approach, which is defined as describing the phenomenon to be studied and collecting information about it. It is a method that relies on studying reality and is concerned with describing it accurately and expressing it qualitatively or quantitatively. This approach in the current study aims to collect data that is suitable for the questions and objectives of the study, especially about revealing the role of the digital story in promoting preventive health concepts among primary-stage students.

4.1 The study's sample

The study sample consisted of primary-stage teachers in the public schools located in the Directorate of Education of Amman, in the second semester of the academic year 2022-2023. Their number amounted to 218 teachers. See Table 1shows the distribution of the study population according to the variables used in the study.

Table 1. Distribution of the study population according to the variables of gender, academic qualification, and years of experience

Variable	Variable levels	Frequency	Percentage %
Gender	Male	97	44.3
	Female	121	55.7
Academic qualification	Bachelor's degree	147	67.1
	Higher Diploma	38	17.8
	Master's degree	33	15.1
Years of experience	Less than 5 years	78	35.6
	From 5-10 years	72	33.3
	More than 10 years	68	31.1
Total		218	100.0

5 Measurement instruments

A questionnaire was designed in two parts. The first part contained questions about personal information related to the study sample. The second part included 30 items on six different preventive health concepts, namely food health, risk management, personal health, environmental health, first aid, and physical health.

The questionnaire was presented to a group of arbitrators with experience and specialization in curricula, teaching methods, and educational technology to ensure validity. After the questionnaire was received back from the specialists, appropriate modifications and additions were made so that the study tool was finalized consisting of 30 items. To ensure the stability of the questionnaire, the internal consistency coefficient of the questionnaire's areas was calculated according to the Cronbach alpha equation for internal consistency. See Table 2 shows the stability coefficient of the questionnaire and its areas.

Table 2. The stability coefficient of the questionnaire and its areas

Areas	Stability of the internal consistency
The entire questionnaire	0.920
First area: food health	0.887
Second area: risk management	0.855
Third area: personal health	0.736
Fourth area: environmental health	0.865
Fifth area: first aid	0.824
Sixth area: physical health	0.720

Table 2 shows that the values of Cronbach's alpha stability coefficients for the questionnaire's areas regarding the role of the digital story in promoting the concepts of preventive health among primary-stage students ranged between (0.720-0.887), and the stability coefficient of the entire questionnaire was (0.920), a value indicating a high degree of stability to apply the tool.

5.1 Correcting the questionnaire

To correct the questionnaire, a five-point Likert scale was adopted to measure the role of the digital story in promoting preventive health concepts among primary-stage students. The answers included strongly agree (5 degrees), agree (4 degrees), neutral (3 degrees), disagree (2 degrees), and strongly disagree (1 point). The means were judged as follows:

- From (1.00-2.33): a low level.
- From (2.34-3.66): an average level.
- From (3.67-5.00): a high level.

6 Data analysis

Study questions were tested using the following statistical methods:

- Means, standard deviations, frequencies, and percentages.
- T-test
- Three-way analysis of variance (Three-way ANOVA)

7 Results and discussion

7.1 Results and discussion related to the first question

What is the role of the digital story in promoting the concepts of preventive health among primary-stage students?

To answer this question, the arithmetic means and standard deviations of the responses of the study sample were calculated for the study areas and on the items of each area of the entire tool. See Table 3 shows the results of the first question.

Table 3. The arithmetic means and standard deviations of the items in the study areas about the role of the digital story in promoting the concepts of preventive health among primary-stage students

No.	Item	Rank	Arithmetic mean	Standard deviation	Degree
A digital story:					
2	helps the student to identify food alternatives to meet food needs	1	3.92	.933	High
4	gives an opportunity for the student to discover foods with harmful artificial colors	2	3.90	.957	High
5	helps the student to distinguish between bad and healthy eating habits	3	3.81	.840	High
3	provides the student with healthy kitchen skills with healthy steps and tools for preparing and eating food	4	3.67	1.042	High

No.	Item	Rank	Arithmetic mean	Standard deviation	Degree
1	provides students with the opportunity to explore the relationship between good food and healthy bodies	5	3.60	.910	Medium
First area: food health			3.78	.779	High
6	reminds the student of the rules and regulations of public security and safety in a simplified manner	1	3.76	1.032	High
7	develops the student's behavior indirectly toward safety regulations	2	3.16	1.121	Middle
8	encourages the student to remember the rules and regulations and abide by them	3	3.04	1.159	Middle
9	shows the student the most important risks that can cause death and abnormalities	4	2.95	1.082	Middle
10	provides the student with the opportunity to discover some of the risks surrounding him and their causes	5	2.93	1.161	Medium
Second area: risk management			3.17	.682	Medium
14	provides students with the opportunity to simulate and imitate personal care practices	1	3.64	1.113	Medium
15	shows students how to take care of their five senses	2	3.46	1.093	Medium
11	exposes students to personal care and hygiene practices	3	3.43	1.176	Medium
12	reinforces the importance of using personal tools and not using the tools of others	4	3.37	1.123	Medium
13	explains how daily habits support the student's positive personality	5	3.29	1.115	Medium
Third area: personal health			3.44	.784	Medium
20	helps students find solutions to environmental pollution problems	1	4.03	.898	High
16	allows the student to reflect on and identify the types of environmental pollution	2	3.69	1.126	High
19	provides an opportunity for students to explore the effects of environmental pollution on humans and other organisms	3	3.49	1.279	Medium
18	refers to the misuse of environmental resources	4	3.40	1.205	Medium
17	allows giving the student the opportunity to reach the concept of environmental health	5	3.38	1.180	Medium
Fourth area: environmental health			3.60	.703	Medium
21	shows the student a set of domestic and traffic accidents	1	3.97	.913	High
23	gives students the opportunity to explore ways to deal properly with accidents	2	3.96	.925	High
24	shows the student the possible way to treat some injuries	3	3.93	1.020	High
25	shows the student the basics of dealing with animal injuries and poisonous insects	4	3.84	1.023	High

No.	Item	Rank	Arithmetic mean	Standard deviation	Degree
22	allows the student to reflect on the causes of home and traffic accidents	5	3.80	.961	High
Fifth area: first aid			3.90	.613	High
26	provides the student with illustrated physical sports activities	1	4.07	.870	High
27	allows the student to choose the appropriate physical sports activities	2	3.89	.924	High
29	provides opportunities to enhance the physical activity of the student	3	3.76	.968	High
30	offers opportunities to simulate the sporting activities	4	3.74	1.096	High
28	provides the student with many benefits of physical exercise	5	3.71	1.034	High
Sixth area: physical health			3.83	.674	High
The role of the digital story in promoting the concepts of preventive health among primary stage students			3.62	.347	Medium

Table 3 shows that arithmetic means for the items of the role of the digital story in promoting the concepts of preventive health among primary-stage students ranged between (2.93) and (4.07), and the arithmetic averages for the areas ranged between (3.17) and (3.90). The fifth area, "**First Aid**", ranked first with an average of (3.90), followed by the sixth area, i.e., **physical health**, with an average of (3.83). The first area, "**food health**", ranked third with an average of (3.78). The arithmetic means for the role of the digital story in enhancing the concepts of preventive health among primary stage students was (3.62), with a standard deviation of (0.347) and the degree is medium.

The high degrees of preventive health concepts in the field of first aid, physical health, and food health in the current study are due to several factors. One of the reasons is that the digital story attracts the attention of students, particularly in the primary stage, so they interact with its content and elements including sounds, images, colors, and movements. It may also be attributed to the multiplicity of first aid, physical, and nutritional health activities used in the digital story, which can make the learning environment attractive for student learning and motivate teachers to enhance these concepts among students, understand them in an abstract way, distinguish and find relationships between them in a greater way, and all of this may help in strengthening them among students. This result is in line with the studies of [37, 43] and [45].

The reason may be the high level of including preventive health concepts in these areas in the curricula used in the primary stage, so teachers seek to emphasize them among the students using the digital story. In addition, the digital story in the primary stage includes situations from the reality of students' lives, which are represented by first aid, physical health, and food health. In addition, class teachers use the digital story in an organized sequence in accordance with what is included in the curricula of the primary stage with regard to preventive health concepts, which focus more on the concepts of first aid, physical health, and food health. This goes in line with [35, 36] and [38] as they assert the effectiveness of the digital story in the primary stage.

Regarding the concepts in the areas of risk management, personal health, and environmental health, they have medium degrees in the current study, and the lowest is risk management. This can be attributed to the lack of balance in including these concepts in the curricula of the primary stage, as they at that stage focused more on basic concepts in the field of first aid, physical and food health. Curricula designers and developers can see that these concepts should be placed in higher educational stages, as they need greater attention and focus on levels of investigation, although they are among the most important concepts of preventive health that must be promoted among students in the first three grades of the primary stage students in the 21st century. This result differs from the study of [42], which indicates the effectiveness of the digital story in increasing awareness and environmental behavior among students. In addition, it is inconsistent with the study of [43], which confirmed the major role of the digital story in developing some health concepts.

The key role of the digital story in promoting the concepts of preventive health has a medium degree, and this can be attributed to the focus of the digital story on the evaluation of preventive health concepts, since such evaluation can allow students to explain their roles in health prevention. It also allows critical thinking with healthy thoughts, and this goes in agreement with [45]. However, the digital story failed to support aspects of reflection and reasoning for some preventive health concepts, which appear clearly in the field of risk management and environmental and personal health. This may be attributed to the insufficient training of primary-stage teachers in the use of the digital story to promote the concepts of preventive health as one of the topics that became more focused in the 21st century, specifically the concepts of risk management and environmental health, among others.

It can be concluded, from the foregoing, that the digital story has a key role in promoting the concepts of preventive health in the first grades of the primary stage, and this shows that the current study added to what others have presented in this field. This also directs the attention of the primary-stage curricula designers, specifically the first three grades, to consider digital tools and activate them in teaching the curricula. In addition, the current study contributed to highlighting the role of the digital story as an interesting teaching method for students and activating it to achieve multiple educational objectives, including the promotion of preventive health concepts. This study is considered one of the first studies aimed at identifying the role of the digital story in promoting the concepts of preventive health in its various and important fields in the 21st century. In general, the findings reached by this study agreed with the results of previous studies, which emphasized the need to benefit from the digital story and employ it in the teaching of primary-stage students. Among such studies are the studies of [35, 36, 38], and [41].

7.2 Results and discussion related to the second question

Are there statistically significant differences between the responses of the study sample about the role of the digital story in promoting preventive health concepts due to gender, academic qualification, and years of experience?

To answer this question, the arithmetic means and standard deviations were calculated for the role of the digital story in promoting the concepts of preventive health according to the variables of gender, academic qualification, and years of experience. See Table 4 shows the results.

Table 4. Arithmetic means and standard deviations of the role of the digital story in promoting the concepts of preventive health according to the variables of gender, academic qualification, and years of experience

Variable	Variable levels	Arithmetic mean	Standard deviation
Gender	Male	3.67	0.349
	Female	3.58	0.341
Academic qualification	Bachelor's degree	3.62	0.346
	Higher Diploma	3.65	0.342
	Master's degree	3.57	0.364
Years of experience	Less than 5 years	3.57	0.386
	From 5-10 years	3.64	0.315
	More than 10 years	3.66	0.330

Table 4 shows that there are apparent differences in the arithmetic means of the role of the digital story in promoting the concepts of preventive health due to the variables of gender, academic qualification, and years of experience, and to see whether these phenomenal differences are statistically significant, three-way ANOVA analysis was used. See Table 5 shows the results.

Table 5. Three-way ANOVA for differences in the arithmetic means of the role of the digital story in promoting preventive health concepts according to the variables of gender, academic qualification, and years of experience

Source of variation	Sum of squares	Degrees of freedom	Mean of squares	f-value	Significance level	η2
Gender	.447	1	.447	3.756	.054	.017
Qualification	.138	2	.069	.581	.560	.005
Years of experience	.331	2	.166	1.393	.251	.013
Error	25.344	213	.119			
Total	26.272	218				

Table 5 above shows that there were no statistically significant differences in the arithmetic means of the role of the digital story in promoting the concepts of preventive health due to the variables of gender, academic qualification, and years of experience. This is evident as the f-values were (3.756, 0.581, and 1.393), respectively, which are not statistically significant at the level of significance (0.05). These results are attributed to the fact that the prevailing nature of teaching students in the first three grades of the primary stage and classroom practices do not differ between male and female schoolteachers, nor do they differ according to the years of experience, whether the experience is less than 5 years, between 5-10, or over 10 years. In addition, it does not

differ according to the academic qualification. This is due to the importance of this primary educational stage in the student's life, as the teachers of the first grades who have different educational qualifications and years of experience, or even teachers with different genders all work in one educational system and receive one training in teaching the first grades in the primary stage, and they teach the same curricula to students at that stage.

8 Conclusion and future studies

One of the most important aims of the study is to emphasize the role of the digital story, specifically in the primary stage, because of its positive impact in promoting concepts in general and the concepts of preventive health in particular. The digital story is one of the successful methods that attract students and achieve educational goals in a simple and interesting way, and this is consistent with what was shown by the study of Munajah, Sumantri, and Yufiarti [36]. In addition, using technology in education saves much time and effort for primary school teachers, and thus increases teachers' satisfaction with students' progress in many different aspects, including the preventive health aspect. It is clear that first-grade teachers have different academic qualifications and years of experience. However, all work within one educational system and receive the same training in teaching first graders. Therefore, it can be concluded that it is necessary to focus on refining the skills of primary-stage teachers to employ the digital story for promoting preventive health concepts through specialized training courses. It is also extremely important to take into account the balance in including these concepts in the primary stage curricula and to include the concepts of risk management and personal and environmental health, as they need greater attention and focus in the period of student's own discovery of the reasons for the occurrence of risks and thus avoiding them.

Based on the previous findings, there are some suggestions for some titles for future studies, such as "the effectiveness of the digital story in developing life skills of primary-stage students." Other examples are "the use of the digital story in different curricula" and "the impact of using the digital story in developing computer skills in the primary stage."

The study recommends making use of the tools mentioned in the study to keep abreast of educational developments and employ them in teaching the primary stage. It also recommends taking into account the balance in the distribution of preventive health concepts in the curricula of that stage, holding annual forums and training courses to refine the skills of primary school teachers concerning preventive health concepts and the way they should be presented to students through digital teaching strategies. This is consistent with what König et al [48] showed, that teachers need special training to improve their efficiency in employing technology in education. This was also confirmed by the study of Kaiser and König [49] about the importance of teacher competence in achieving the relevant educational goals successfully. Other recommendations include activating extracurricular activities in promoting preventive health concepts in the primary stage, using the digital story, and designing and

publishing digital stories separate from the content of the primary stage curricula to promote preventive health concepts in various fields. Finally, the study highlights the importance of providing school libraries with digital stories that promote the concepts of preventive health among students.

9 References

[1] A. M. B. Pavani, "CMaps, Learning Objects and a Blended Learning Signals & Systems Course," *International Journal of Engineering Pedagogy (iJEP)*, vol.4, no.5, pp. 5–11, 2014. https://doi.org/10.3991/ijep.v4i5.3533

[2] A. K. Barianos, A. Papadakis, and N. Vidakis, "Content manager for serious games: Theoretical framework and digital platform," *Advances in Mobile Learning Educational Research*, vol.2, no.1, pp. 251-262, 2022. https://doi.org/10.25082/AMLER.2022.01.009

[3] UNESCO Information and Communication Technology in Teacher Education: A Planning Guide. 2002. Available online https://unesdoc.unesco.org/ark:/48223/pf0000129533

[4] P. Jadhav, H. Gaikwad, and K.S. Patil, "Teaching and learning with technology: Effectiveness of ICT integration in schools," *ASEAN Journal for Science Education*, vol.1, no.1, pp.33-40, 2022.

[5] D.A. Khotima, and H. Pratama, "The Effectiveness of Android-Based Science Learning Model to Increase Student Learning Outcomes," *Asian Pendidikan,* vol. 2, no.1, pp.33-41, 2022. https://doi.org/10.53797/aspen.v2i1.5.2022

[6] J. M. Aguayo, J. Valdes, V.H. Cordoba, M.V. Najera,´ F.R. Azquez, E. Munoz, and C. Garc´ıa Lirios," Digital activism in students of a university in central Mexico in the COVID-19 era. *Advances in Mobile Learning Educational Research,* vol. 2, no1, pp. 297-307, 2022. https://doi.org/10.25082/AMLER.2022.01.014

[7] B.R. Robin, "Digital storytelling: a powerful technology tool for the 21st century classroom," *Theory into Practice,* vol. 47, no.9, pp. 220-228, 2008. https://doi.org/10.1080/00405840802153916

[8] S. M. Thang, L. K. Lin, N. Mahmud, K. Ismail, and N. A. Zabidi, "Technology integration in the form of digital storytelling: mapping the concerns of four Malaysian ESL instructors," *Computer Assisted Language Learning*, vol.27, no.4, pp. 311-329, 2014 https://doi.org/10.1080/09588221.2014.903979

[9] C.C. Shelton, L.M. Archambault, and A.E. Hale, "Bringing Digital Storytelling to the Elementary Classroom: Video Production for Preservice Teachers," *Journal of Digital Learning in Teacher Education*, vol.33, no.2, pp.58-68, 2017 https://doi.org/10.1080/21532974.2016.1276871

[10] R. Rachmadtullah, M.S. Zulela, and M.S. Sumantri, "Development of computer-based interactive multimedia: Study on learning in elementary education," *International Journal of Engineering and Technology (UAE),* vol.7, no.4, pp.2035-2038. 2018. https://doi.org/10.14419/ijet.v7i4.16384

[11] H. Mahdi, A. Darwish, and R. Al-Jarf, "The Effectiveness of the Strategy of Digital Storytelling in the Acquisition of Technological Concepts in Basic Ninth Grade Students in Gaza," *Journal of Al-Quds Open University for Educational and Psychological Research and Studies,* vol.13, no.4, 2017 https://doi.org/10.12816/0027565

[12] HW. Liu, HR. Liu, HJ. Yang, EZ. Yu, "A Creative Computing Approach to Film-story Creation: A Proposed Theoretical Framework," *International Journal of Automation and Computing,* vol.17, pp. 678–690, 2020. https://doi.org/10.1007/s11633-020-1238-8

[13] A. Stawinski, "Truth in Myth and Science, Dialogue and Universalism," *The Journal of the International Society for Universal Dialogue*, vol.1, no.2, 2005 https://doi.org/10.5840/du2005151/265

[14] A. Maksum, E.N. Wahyuni, R. Aziz, S. Hadi, and D. Susanto, "Parents' and children's paradoxical perceptions of online learning during the Covid-19 pandemic," *Advances in Mobile Learning Educational Research,* vol.2, no.2, pp. 321-332, 2022. https://doi.org/10.25082/AMLER.2022.02.002

[15] H. Forest, "*Storytelling in the Classroom Concepts and Activities*," Retrieved OCT, 2000. www.storyarts.org/articles/storytelling.html

[16] P.R. Lim, and N. Md Noor, " Digital Storytelling as a Creative Teaching Method in Promoting Secondary School Students' Writing Skills," *International Journal of Interactive Mobile Technologies*, vol.13, no.07, pp. 117–128, 2019. https://doi.org/10.3991/ijim.v13i07.10798

[17] A. Norman, "Digital Storytelling in second language learning," Unpublished Master's Thesis, Norwegian University of Science and Technology, Norway, 2011 http://hdl.handle.net/11250/270258

[18] M. Frazel, *Digital storytelling Guide for Educators. International Society for Technology in Education*, Eugene Oregon, Washington, DC, 2011 https://www.scribd.com/document/205186424/Digital-Storytelling-Guide-For-Educators-Frazel

[19] N. Khamcharoen, T. Kantathanawat, and A. Sukkamart," Developing Student Creative Problem-Solving Skills (CPSS) Using Online Digital Storytelling: A Training Course Development Method," *International Journal of Emerging Technologies in Learning (iJET)*, vol.17, no.11, pp.17–34, 2022. https://doi.org/10.3991/ijet.v17i11.29931

[20] A. Aşık, "Digital Storytelling and Its Tools for Language Teaching: Perceptions and Reflections of Pre-Service Teachers," *International Journal of Computer-Assisted Language Learning and Teaching (IJCALLT)*, vol. 6, no.1, pp.55-68, 2016. https://doi.org/10.4018/IJCALLT.2016010104

[21] J. Dougill, *Drama Activities for Language Learning,* 1 Edition, Macmillan Publishers Ltd. London, 1987.

[22] S. Al-Harbi, "The effectiveness of digital stories in developing critical listening skills in the English language course for the students of the secondary stage students in Riyadh," *International Journal of Education,* vol.5, no.8, pp.276-308, 2016 https://iijoe.org/index.php/IIJE/issue/view/43

[23] J. Masuram, and P.N. Sripada, "Digital stories to enhance cognitive abilities among learners," 11th International Conference on Advances in Computing, Control, and Telecommunication Technologies, ACT 2020, pp 255–259.

[24] N. Preradovic, G. Lesin, and D. Boras, "Introduction of Digital Storytelling in Preschool Education: a Case Study from Croatia," *Digital Education Review,* vol.1, no. 30, 2016. https://revistes.ub.edu/index.php/der/article/view/17317/pdf

[25] A. Abdul-Mahdi, and Q. Rahi, "Studying the concepts of preventive education and contemporary biological technologies in biology books for the intermediate stage," *Journal of the College of Education for Girls in Human Sciences*, vol.8, no.15, 2014. https://search.emarefa.net/detail/BIM-428491

[26] A. Amin, " A program based on body awareness activities to develop the preventive awareness of the kindergarten children," *Al-Tufola Magazine,* vol.31, no.2, 2019. https://doi.org/10.21608/jchild.2019.73347

[27] A. Mutawa, "The effect of a health education program on some healthy skills and Behaviour," Master Thesis, Faculty of Physical Education, Benha University, 2017. https://www.fphe.bu.edu.eg/index.php/item/3080-2017-05-27-09-24-07

[28] K. Hamilton, S. Cornish, A. Kirkpatrick, J. Kroon, and R. Schwarzer, "Parenal Supervision for Their Children's Toothbrushing, Mediaing Effects of Plunning Self Efficacy, and Action Control," *British Journal of Health Psychology,* vol.8, no.2, pp.387-406, 2018 https://doi.org/10.1111/bjhp.12294

[29] R. Al-Dasouki, "The effectiveness of using a guide in nutritional education for the teacher and the family to develop nutritional awareness among kindergarten children," Unpublished master's thesis, College of Education, South Valley University, 2016.

[30] I. Mohamed, "The effect of a program using motor games to develop basic skills and health concepts for kindergarten children," Ph.D. thesis, Faculty of Early Childhood Education, Minia University, 2017.

[31] M.W. Kane, *Understanding Health*, 2nd Edition. Random House School, NewYork, 2020.

[32] Education Development Center, *Improving Health and Safety in the Workplace*, Teenage Health Teaching Modules, Newton Mass, P.147, 2020.

[33] V. Bernard, Z. Steve, *Children Medical Guide*, DK publishing Inc, P.120, 2017.

[34] A. Poonsawad, J. Srisomphan, and C. Sanrach, "Synthesis of Problem-Based Interactive Digital Storytelling Learning Model Under Gamification Environment Promotes Students' Problem-Solving Skills," *International Journal of Emerging Technologies in Learning*, vol. 17, no. 05, pp.103–119,2022. https://doi.org/10.3991/ijet.v17i05.28181

[35] İ. Demirbaş, A. Şahin, "The effect of digital stories on primary school students' creative writing skills," *Education and Information Technologies,* 2022. https://doi.org/10.1007/s10639-022-11440-7

[36] R. Munajah, M.S. Sumantri, and Y. Yufiarti, "The use of digital storytelling to improve students' writing skills," *Advances in Mobile Learning Educational Research*, vol.3, no.1, pp.579-585, 2022. https://doi.org/10.25082/AMLER.2023.01.006

[37] M.M. Sawalmeh, "Jordanian Primary School Teachers' Attitudes towards Using the Storytelling Strategy in Math Course: Empirical Study," *International Academic Journal in Educational and Psychological Sciences,* vol.2, no.2, pp. 37-50, 2021. https://iajour.com/index.php/eps/article/view/208

[38] S. Al-Ardan, "The effectiveness of interactive educational stories in improving some of the oral expression skills of sixth grade students in Hail,"*Jadara Journal of Studies and Research,* vol.7, no.1, pp. 138–164, 2021. https://doi.org/10.54161/jrs.v7i1.110

[39] D. Yocom, C. Bashaw, D. Price, and M. Cook, "Perceptions of digital storytelling in the classroom," *Teaching and Learning in Nursing*, vol.15, no.3, pp.164-167, 2020. https://doi.org/10.1016/j.teln.2020.01.01

[40] J. Wu, and D.T.V. Chen, "A systematic review of educational digital storytelling," *Computers and Education*, vol.147, 103786, 2020. https://doi.org/10.1016/j.compedu.2019.103786

[41] T. Al-Barri, "The impact of digital storytelling on developing the skill of listening comprehension among third-grade female students in Mafraq Governorate," Unpublished master's thesis, Al Al-Bayt University, Jordan, Mafraq, 2020.

[42] E. Hafez, "The effectiveness of using environmental digital stories in teaching social studies to develop environmental awareness and behavior among fourth grade students," *Journal of Scientific Research in Education, Ain Shams University*, vol.21, no.6, 2020. https://doi.org/10.21608/jsre.2020.107639

[43] M. Abdel-Moamen, "Employing the digital story in development of the some health concepts of kindergarten children," *IUG Journal of Educational and Psychological Sciences,* vol.26, no.3, pp.296-326, 2018. https://journals.iugaza.edu.ps/index.php/IUGJEPS/article/view/3474

[44] I. Al-Zuhd, "The effect of using digital storytelling on undergraduate EFL students' speaking skills and motivation Master," Unpublished master's thesis, Al Al-Bayt University, Jordan, Mafraq, 2018.
[45] S. Fletcher, J. Mullett, "Digital stories as a tool for health promotion and youth engagement," *Canadian Journal of Public Health,* 107, e183–e187, 2016. https://doi.org/10.17269/cjph.107.5266
[46] A. Tzavara, K. Lavidas, V. Komis, A. Misirli, T. Karalis, and S. Papadakis, "Using Personal Learning Environments before, during and after the Pandemic: The Case of e-Me," Education Sciences, vol.13, no.87, 2023. https://doi.org/10.3390/educsci 13010087
[47] M. Raja, and G.G. Lakshmi Priya, "Using virtual reality and augmented reality with ICT tools for enhancing quality in the changing academic environment in COVID-19 pandemic: An empirical study," *Technologies, Artificial Intelligence and the Future of Learning Post-COVID-19*, pp.467-482.2022. https://doi.org/10.1007/978-3-030-93921-2_26
[48] J. Konig, D.J. Jager-Biela, and N. Glutsch, "Adapting to online teaching during COVID-19 school closure: teacher education and teacher competence effects among early career teachers in Germany," *European Journal of Teacher Education,* vol.43, no.4, pp. 608-622, 2020. https://doi.org/10.1080/02619768.2020.1809650
[49] G. Kaiser and J. König. 2019. "Competence Measurement in (Mathematics) Teacher Education and Beyond: Implications for Policy." *Higher Education Policy,* vol. 32, pp. 597–615, 2019. https://doi.org/10.1057/s41307-019-00139-z

10 Author

Dr. Reem AbdElkareem AlOmoush is an assistant professor in Curriculum and Teaching Methods in the Department of Administration and Curriculum, Faculty of Arts and Educational Sciences, Middle East University, And Researcher in Curriculum and Instruction and Technology Enhanced Learning; she is often works as a reviewer in some international journals and as a Trainer in educational and psychological sciences. https://orcid.org/0000-0002-3156-5560

Article submitted 2023-03-09. Resubmitted 2023-04-29. Final acceptance 2023-04-29. Final version published as submitted by the author.